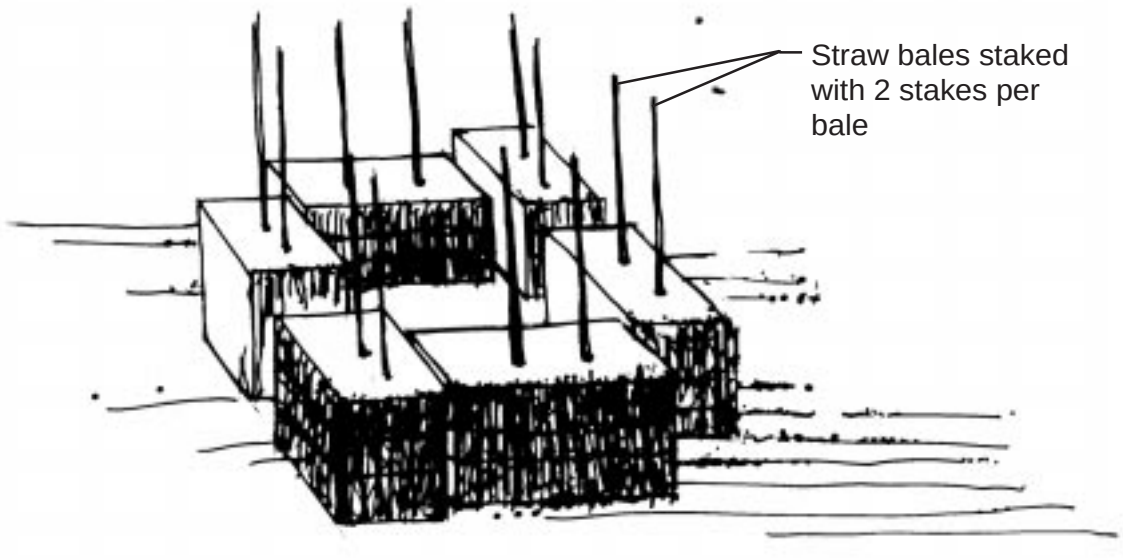
PRIMARY USE: To prevent sediment and debris from entering storm drainage systems.
ADDITIONAL USES: Used to: provide protection from sediment by reducing flow velocity and forming a shallow settling basin for stormwater, create an effective settling pool to remove sediment at stormwater inlet, prevent sediment from entering the storm drain during construction, and provide permanent protection for a storm drain after the drainage area is stabilized.

STORM DRAIN INLET PROTECTION

What is it? A sediment filter or an excavated impounding area around a storm drain drop inlet or curb inlet.

Purpose

To prevent sediment from entering storm drainage systems prior to permanent stabilization of the disturbed area and provide permanent protection for a storm drain after the drainage area is stabilized.



Straw Bale Drop Inlet Sediment Filter
Perspective View

Limitations

This practice is limited to drainage areas not exceeding one acre (0.4 hectare) and is not intended to control large, concentrated stormwater flows.

Materials

Straw bales and stakes, silt fences, excavated earth, blocks and gravels, and grates.

Installation

Areas where storm drain inlets are to be made operational before and after permanent stabilization of the disturbed drainage area. Different types of structures are applicable to different conditions.

Source: NRCS Planning and Design Manual, NRCS.

STORM DRAIN INLET PROTECTION

Additional Considerations:

Storm sewers which are made operational before their drainage area is stabilized can convey large amounts of sediment to natural drainage ways. In case of extreme sediment loading, the storm sewer itself may clog or lose a major portion of its capacity. To avoid these problems, it is necessary to prevent sediment from entering the system at the inlets. This practice contains several types of inlet filters and traps which have different applications dependent upon site conditions and type of inlet. Other innovative techniques for accomplishing the same purpose are encouraged, but only after specific plans and details are submitted to and approved by the permitting agency.

Note: These various inlet protection devices are for drainage areas of less than one acre (0.4 hectare). Runoff from large disturbed areas should be routed through a temporary sediment basin.

Design Criteria

General:

- The drainage area should be no greater than 1 acre (0.4 hectare).
- The inlet protection device should be constructed in such a manner that will facilitate cleanout and disposal of trapped sediment and minimize interference with construction activities.
- The inlet protection devices should be constructed in such a manner that any resultant ponding or stormwater will not cause excessive inconvenience or damage to adjacent areas or structures.

1. STRAW BALE DROP INLET STRUCTURE

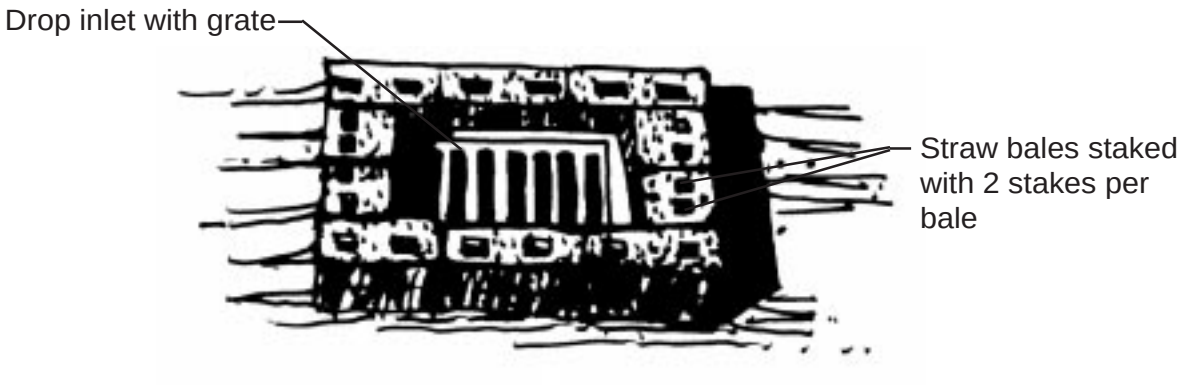
a. Bales should be either wire-bound or string-tied with the bindings oriented around the sides rather than over and under the bales.
b. Bales should be placed lengthwise in a single row surrounding the inlet with the ends of adjacent bales pressed together.
c. The filter barrier should be entrenched and backfilled. A trench shall be excavated around the inlet the width of a bale to a minimum depth of 6 in (102 mm). After the bales are staked, the excavated soil shall be backfilled and compacted against the filter barrier.
d. Each bale should be securely anchored and held in place by at least two stakes or rebars driven through the bale.
e. Loose straw should be wedged between bales to prevent water from entering between bales.

Specific Application:

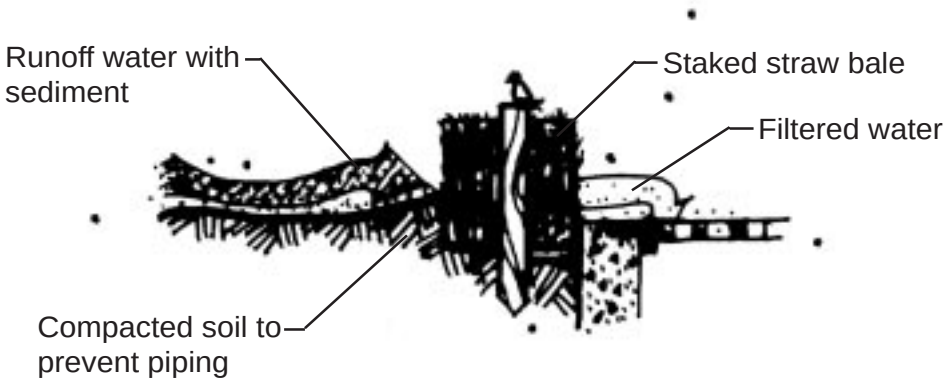
This method of inlet protection is applicable where the inlet drains a relatively flat area (slopes no greater than 5 percent), and where sheet or overland flows occur (flows not exceeding 0.5 cfs (0.014 cu. meter/sec)) are typical. The method should not apply to inlets receiving concentrated flows, such as in street or highway medians.

STORM DRAIN INLET PROTECTION

Additional Drawings:



Straw Bale Drop Inlet Sediment Filter
Perspective View



Straw Bale Drop Inlet Sediment Filter
Section View

Source: NRCS Planning and Design Manual, NRCS.

STORM DRAIN INLET PROTECTION

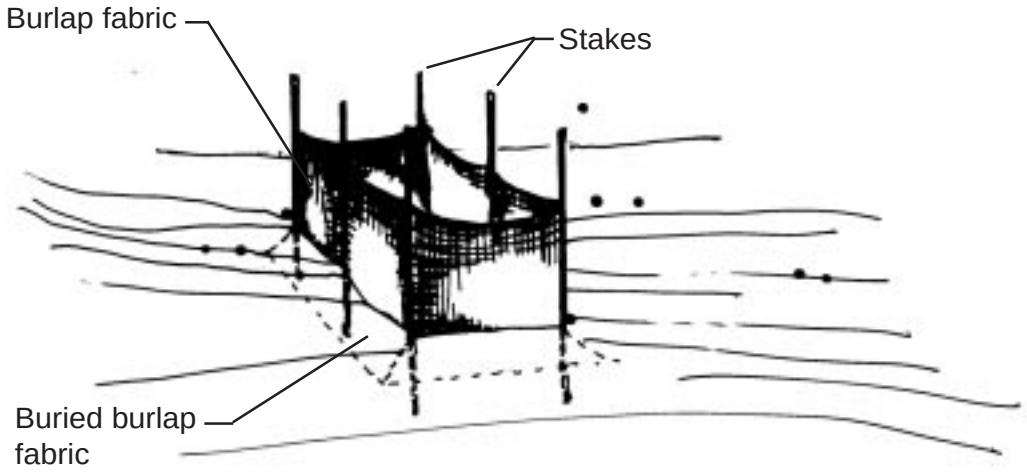
Additional Considerations and Drawings:

2. SILT FENCE DROP INLET SEDIMENT FILTER

a. Fence should be 10 ounce per square yard (0.28 kg per square meter) and shall be cut from a continuous roll to avoid joints.
b. Stakes should be 1 x 2 in (25 x 51 mm) wood - preferred - or equivalent metal with a minimum length of 3 ft (0.9 m).
c. Staples should be of heavy duty wire at least 1/ 2 in (13 mm) long.
d. Stakes should be spaced around the perimeter of the inlet a maximum of 3 ft (0.9 m) apart and securely driven into the ground minimum of 8 in (203 mm).
e. A trench should be excavated approximately 4 in (102 mm) wide and 4 in (102 mm) deep around the outside perimeter of the stakes.
f. The fabric should be stapled to the wooden stakes, and 8 in (203 mm) of the fabric shall be extended into the trench. The height of the filter barrier should be a minimum of 15 in (381 mm) and shall not exceed 18 in (457 mm).
g. The trench should be backfilled and the soil compacted over the fabric.
h. Silt fence fabric may be used in lieu of burlap fabric if installed in accordance to the specifications listed in best management practices.

Specific Application:

This method of inlet protection is applicable where the inlet drains a relatively flat area (slopes no greater than 5 percent), and where sheet or overland flows occur (flows not exceeding 0. 5 cfs (0.014 cu. meter/sec)) are typical. The method should not apply to inlets receiving concentrated flows, such as in street or highway medians.



Silt Fence Drop Inlet Sediment Filter
Perspective View

Source: NRCS Planning and Design Manual, NRCS.

STORM DRAIN INLET PROTECTION

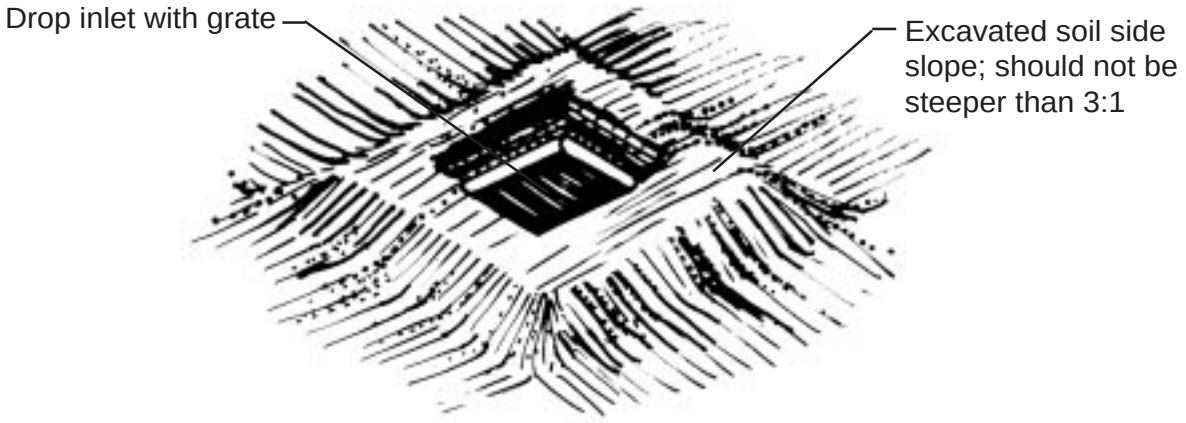
Additional Considerations and Drawings:

3. EXCAVATED DROP INLET SEDIMENT TRAP

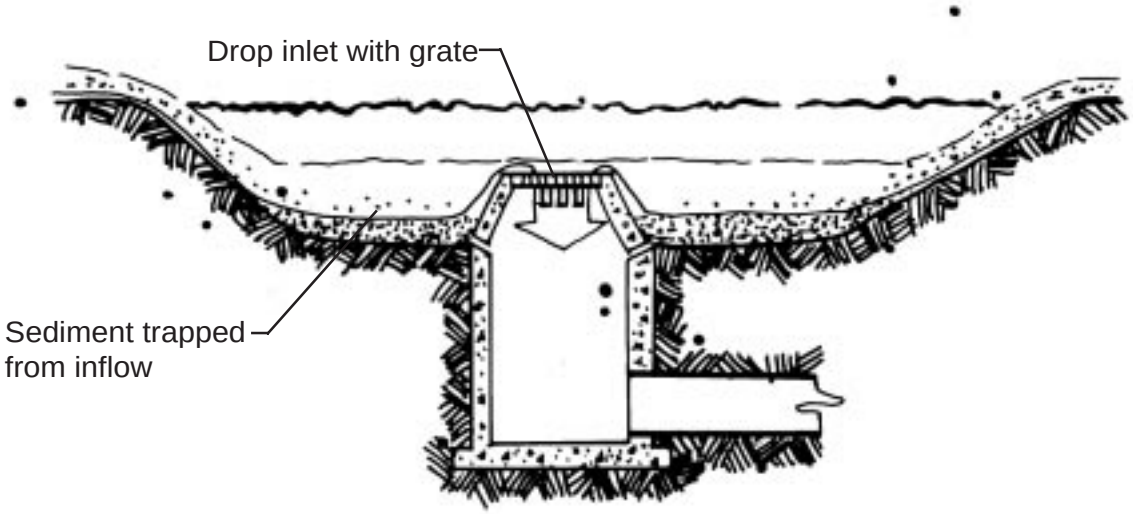
a. The excavated trap should be sized to provide a minimum storage capacity calculated at the rate of 67 cubic yards for 1 acre (127 cubic meters for 1 hectare) of drainage area. A trap should be no less than 1 ft (0.3 m) nor more than 2 ft (0.6 m) deep measured from the top of the inlet structure. Side slopes should not be steeper than 3:1.

b. The slope of the basin may vary to fit the drainage area and terrain. Observations must be made to check trap efficiency and modifications shall be made as necessary to insure satisfactory trapping of sediment. Where an inlet is located so as to receive concentrated flows, such as in a highway median, it is recommended that the basin have a rectangular shape in 2:1 ratio, with the length oriented in the direction of the flow.

c . Sediment should be removed and the trap restored to its original dimensions when the sediment has accumulated to half the design depth of the trap. Removed sediment should be deposited in a suitable area and in a manner such that it will not erode.



Excavated Drop Inlet Sediment Trap
Perspective View



Excavated Drop Inlet Sediment Trap
Section View

Source: NRCS Planning and Design Manual, NRCS.

STORM DRAIN INLET PROTECTION

Additional Considerations:

4. BLOCK AND GRAVEL CURB INLET SEDIMENT FILTER

a. Two concrete blocks should be placed on their sides abutting the curb at either side of the inlet opening.

b. A 2 in by 4-in (508 mm by 102 mm) stud should be cut and placed through the outer holes of each spacer block to help keep the front blocks in place.

c. Concrete blocks should be placed on their sides across the front of the inlet and abutting the spacer blocks as illustrated.

d. Wire mesh should be placed over the outside vertical face (webbing) of the concrete blocks to prevent stone from being washed through the holes in the blocks. Chicken wire or hardware cloth with 1/ 2 in (13 mm) openings may be used also.

e. DOT No. 1 Coarse Aggregate should be filed against the wire to the top of the barrier as shown.

f. If the stone filter becomes clogged with sediment so that it no longer adequately performs its function, the stone must be pulled away from the block, cleaned and replaced.

Specific Application:

This method of inlet protection is applicable at curb inlets where an overflow capability is necessary to prevent excessive ponding in front of the structure. (see next page for drawings)

General Maintenance for Storm Drain Inlet Protection Structures:

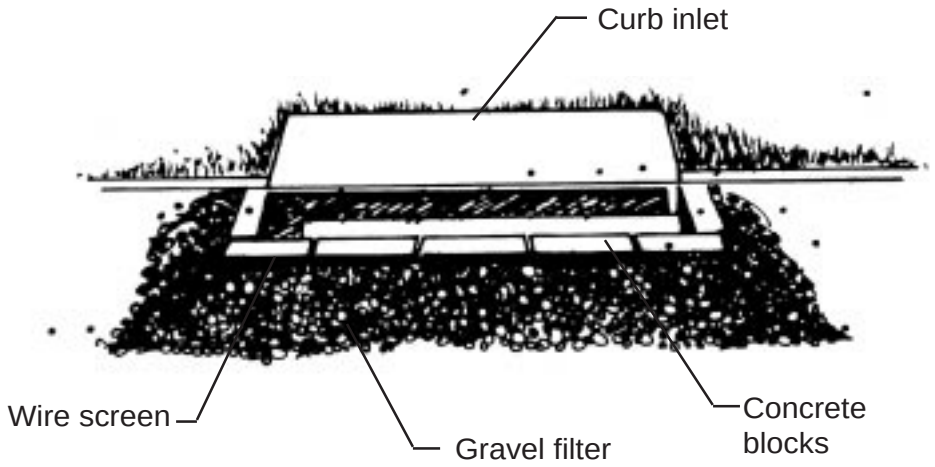
1. The structure should be inspected after each rain and repairs made as needed.

2. Sediment should be removed and the trap restored to its original dimensions when the sediment has accumulated to half the design depth of the trap. Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode.

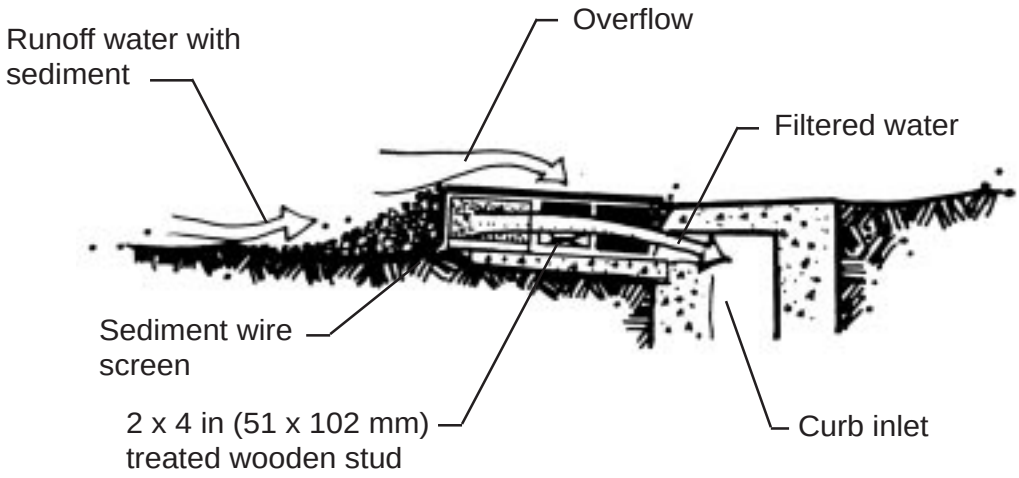
3. Structures should be removed and the area stabilized when the remaining drainage area has been properly stabilized. After a drainage area is stabilized (eg., mulched and seeded) but before permanent vegetation has established itself, the temporary storm drain inlet protection (straw bale, silt fence, excavated, block and gravel) may be removed and replaced with sod to immediately establish filtering vegetation around the inlet. Sod inlet provides permanent protection for a storm drain after the drainage area is stabilized.

STORM DRAIN INLET PROTECTION

Additional Drawings:



Block and Gravel Curb Inlet Sediment Filter
Perspective View



Block and Gravel Curb Inlet Sediment Filter
Section View

Source: NRCS Planning and Design Manual, NRCS.